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A scientific study for determining the school site and space requirements for varying population densities is needed for effective planning. The properly equipped school site should provide enough space to aid in the mental and physical development of every child. Site determinants include--(1) the school population, (2) allowable enrollment per school, (3) the number of schools required in the neighborhood, (4) planned population densities for new neighborhood areas, and (5) distance from home to school. A table of desirable distances between home and school in five different countries and a table of school site standards in four different countries are given. Building requirements are discussed in the context of open space, and large site area versus the multi-storied structure. Space needs are likewise discussed as they relate to extra-curricular activities. The site requirements which are arrived at should be examined for their use efficiency. A bibliography of international sources is included. (NI)

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School Sites and Spaces in High Density Habitations

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SESSION III

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Abstract

The proper distribution and location of primary schools play a significant role in providing a quiet, healthy and pleasant environment. The school site is first and foremost an educational tool, its size determination depends upon the proper understanding of its functional qualities and space requirements for different activities. The prime object in the provision of proper and adequate school site is the educational and physical need of children. The real significance of school site in high density urban areas in providing the proper environment lies in the maximum utilisation of all available spaces. This paper discusses guiding principles and scientific approach to determine the functional space need of primary school sites.

Introduction

Very rapid urbanisation and unprecedented growth of population has jeopardised the concept of communal planning, in towns and cities of today. The impact of this chaotic and unsocial development is apparent from the inadequacy, poor design and ill-maintained school sites and spaces. The environmental qualities of existing school building in terms of health education, childern's safety and the provision of play-spaces is being destroyed, because of enormous town traffic and noise Scarcity of land and soaring densities reflect in the shrinkage of school sites and amenities. A scientific study for determining the school site and space requirements for varying density developments and different habitational units is necessary to achieve effective planning so necessary for enriching the environmental qualities of the human habitations.

Site Adequacy

In primary schools the instructional buildings, outdoor teaching spaces, play areas and physical training spaces determine the site requirements. In the absence of basic studies emperical methods guide the site allocations. At times these are excessive, but mostly due to higher land values they are absolutely inadequate to meet the changing pattern of educational requirements. A survey[1] by National Buildings Organisation conducted in the country to assess the adequacy of site facilities for primary schools is presented in Table I to throw some light on the existing situation.

Table I

Schools According to Plot Areas

Area in sq. meters	No. of schools	Percentage
1—2023	284	59·8
2024—4030	134	16·6
4031—6019	53	6·5
Above 6019	138	17·1
Total	809	100

The old building-based concept of education is outmoded and now it is considered necessary for a properly equipped school that its site should provide space for various teaching and extra-curricular activities and games to help in the mental and physical development of every child. The value of the school site and open spaces assumes much greater significance for high density residential developments with high and low structures where children are deprived of such facilities at their homes because of vertical living or lack of adequate open space in the area.

Site Determinents

The governing criteria for the school sites in urban areas as outlined below are fairly important to guide the allocations.

(a). The school going population ;
(b). Allowable enrolment per school ;
(c). The number of schools required in the neighbourhood ;

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(d). Neighbourhood areas for different densities ;

(e). Distance from school to home ;

To decide upon the number of schools required in different sectors of the city, it is necessary to assess the school going population in relation to the total residents of the neighbourhood. It is assumed for this study that by the year 2000 about 20% of the population of India shall comprise the primary school going age group. The estimate of such population for habitations of different sizes has been accepted to determine the approximate number of schools required. However the dominant factor in deciding the numbers of schools in high density urban developments is the allowable enrolment per school. In recent study[1] of schools according to enrolment it has been observed that 41.1% of schools had enrolment below 150,50.1% of schools had enrolment between 151-450 and only 8.8 schools had enrolment above 450. About the size of schools the opinions in this country vary. In[2] the absence of any objective study in this country or scientifically adopted norms, varying school sizes from 200 to 600 pupils may be considered leaving the choice to the planner in view of the densities adopted for a development.

Compulsory primary education for all children of 5-11 years age-group is envisaged under law and the need of schools therefore should be formulated on the basis of this criterion.

For indicating the various relationships of neighbourhood population, the population of school going children, number of class room units @ 40 students per class and areas of habitational units for different density developments are given in Table II.

Table II

Population	Children population (6-11 yrs) @ 20% of total	Total area for densities in Hectares				No. of class units @ 40 boys/class
		50	100	150	200	
1000	200	8.09	4.04	2.63	2.02	5
2000	400	16.18	8.09	5.39	4.04	10
3000	600	24.28	12.14	8.09	6.07	15
4000	800	32.37	16.18	10.76	8.09	20
5000	1000	40.46	20.23	13.35	10.11	25
6000	1200	48.56	24.28	16.18	12.14	30
7000	1400	56.65	28.33	18.61	14.16	35
8000	1600	64.75	32.37	16.18	16.18	40
9000	1800	72.84	36.42	24.28	18.21	45
10000	2000	80.93	40.46	26.99	20.23	50

The location of schools in high density developments play an important role not only in improving the educational process but also in providing a place where students are free from the disturbing strains of busy and crowded urban life. It is universally agreed that the shorter and safe distance from home to school in urban areas has great importance for proper control on children. The current recommendations about the distances to guide the location of schools generally accepted in different countries are indicated in Table III.

Table III

Desirable distance of schools from home in different countries.

Name of the country	Distance from home to school
England[3]	800 to 1200 metres
U S A[3]	800 metres
Holland[3]	533 metres
Switzerland[3]	533 metres to 800 metres
India[1]	400 metres to 600 metres

The desirable walking distance from home to school ranges between 400 to 1200 metres. For the present study 533 metres as the catchment area of a school has been the guiding factor for analysing the location of schools in high density habitations. In horizontal development where sufficiently large neighbourhood area is needed, the distance from home to school does form an important consideration in location of schools But the study reveals that in the average neighbourhood of high density vertical development the distance distribution per school is much less than the accepted practices of 533 metres.

School Sites

Commonly accepted norms for the school sites as adopted by different countries given in Table IV indicate that very diverse practices are being followed as they do not relate to specific locations or densities.

To determine the critical requirements of school sites scientifically, the following factors must be carefully examined to assess their basic needs :—

a. Building requirements

b. Extra-curricular activities

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Table IV

School Site Standards in different countries

Countries	Size of School	Total area of site in hectare	Source
1	2	3	4
South Africa	200	2.02	The Site C.S.I.R. Research Report 139, Pretoria, South Africa.
	400	2.83	
	650	3.84	
North America	500	8.09	New School Alfred Roth
United Kingdom	200	1.38	The Planning
	400	1.91	
India	600	0.60 to 1.00	Report on Primary - Junior Basic Schools, N. B. O. New Delhi.

Building Requirements

The site requirements of a school complex are influenced, to a great extent, by the size of the building and the nature of its planning. For an open type of planning large site area would be necessary whereas a compact multi-storeyed structure would need lesser area. The provision of ancillary spaces or larger class-rooms would increase the building area. It could as well be reduced by eliminating certain components Similarly, the area under wall and circulation differs according to the structural or planning system. To provide for these variations the building area may be divided in two components of the constant and variable spaces. To work out the specific values of constant the class-room, of 480 sq. ft for 40 childern[5] may be taken in addition to the ancillary accommodation like headmaster room, store and lavatory according to the prevalent practices. To these values provisions for the circulation and wall area can be added in form of percentage of constant.

In view of high land value and shortage of space in urban areas provision of only ground floor schools may not be possible. Therefore, to reduce the built area of school on ground floor the spaces can be distributed on different floors according to their functional significance to arrive at the appropriate area of figures. Physical comfort of childern and economic consideration are critical in determining the number of floors in a vertical development. More than four floor climbing may not be physically comfortable for a child unless a lift is provided and justified economically. The relative values of built area for different space allocations on the ground and upper storeys should be worked out to determine economical and functional layout of the desired size school development.

Extra—curricular Activities

After determining the coverage area of the school building on the ground the space for extra-curricular activities must be added to estimate the school site requirements. For arriving at these values a careful examination of the nature and number of such activities during school hour is necessary. A larger space is needed if all the activities are performed simultaneously. The space needs may be reduced by staggering the activities at difierent school hours. Such an approach also helps to achieve better use index. A study[5] of the school space lists out such activities which can satisfactorily be developed outdoor on site. In high density areas where land is scarce a careful selection and programming of only such activities which are educationally important is necessary. Generally these activities include

a. morning prayer
b. Gardening
c. physical training
d. games

The morning prayer can also be held either in sheltered or in covered spaces if the provision of such activities or multipurpose spaces are made in the building programme. In assessing the space requirements for morning prayer the number of students, the formation of rows, the distance of Reader from front row and the anthropometric dimensions of children for standing posture is critical. Similarly, for garden space where children work in groups or individually a knowledge about the number of children requiring gardening facilities, the number of groups and the constitution of each group, time allotted for gardening, besides the width of the beds on the basis of functional space reach, is necessary.

Before establishing the space requirements for games and playing fields the following is critical :

a. The nature of games and playing facilities.
b. Number of children using the facilities.
c. Basic dimensions of playing equipments and working space.

The space requirements for games and playing facilities form a major part of the school site. The area required for such activities depend upon the nature of children's interest in games and number of such games provided. A large area is required if games requiring larger spaces and smaller number of participants are provided. The space needs could be reduced if games of smaller duration requiring smaller spaces and catering greater number of pupil at a time are introduced. In urban areas where land values are higher only such games which could be played on smaller sites should be selected. The indoor games which could be played in the class-room itself would reduce number of children on site. The site requirements for games and equipments will, however, depend upon the number of participants in games. A survey to assess the percentagc of children using games facilities in playing fields during mid-day lunch break when maximum number of students are in the fields, is necessary to arrive at the required figures. A thorough investigation to ascertain the interest of children in the nature of games is important for the provision of games and equipments.

The assessment of number of students per equipment and game should also be carefully examined. The basic dimensions of equipments and playing fields and their working spaces determine the total space need for play spaces.

Use Factor of Spaces

The site requirements, thus arrived, should be finally scrutinised for its use efficiency. Unless use factor for every item and multiple usages are examined the economic utilisation of space cannot be established The most skilful and economic provision of spaces calls for the full use of every space for maximum number of hour of the school day. Spaces which are not in constant use are uneconomical and involve wasteful capital expenditure. For increased use factor of spaces a well coordinated time-table for games and physical training is necessary.

Conclusions

The study of the factors effecting the site determination of primary schools lead to the following general conclusions :

(a) Physical comfort of children, and relative values of built area on ground and upper storeys are important to determine functional and economical layout of vertical school development.

(b) Outdoor games of smaller duration, requiring smaller spaces and catering greater number of pupil at a time should be selected to achieve economy in land use.

(c) Indoor games should be provided to reduce number of students on site.

(d) Knowledge about interest of children in nature of games, number of students per equipment and game is important for the provision of number of games and equipments.

(e) The basic dimensions of equipments and playing fields is necessary to determine play space need.

(f) A well-co-ordinated time-table for games and physical training is necessary to increase use factor of spaces and achieve economy in land requirement.

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References :

1. Report on Primary-junior Basic schools (enrolment 200 & above) N.B.O., New Delhi.
2. Planning Primary Schools, Ministry of Education, Govt. of India 1959.
3. The New School ALFRED ROTH Zurch 1961.
4. The Site, C. S. I. R. Research Report No. 139. Pretoria, South Africa.
5. Planning Primary Schools R. D. SRIVASTAVA Indian Architect Sept. 1964.
6. Rules of Games and Sports Y.M.C.A. Publishing House 5 Russel Street Calcutta.
7. Report on - Committee of Standardised norms of equipments for Primary and Middle Schools State Institute of Education, Chandigarh.
8. School Building—External facilties Asian Regional Institute for School Building Research Bandung, Indonesia.